ATTACHMENT 1

TECHNICAL COMMENTS AND CLARIFYING CHANGES

Tentative Order - Manteca WQCF

Findings:

Page 5, Finding C.: For clarification, add the following underlined language: "This Order is issued pursuant to section 402 of the Clean Water Act (CWA) and implementing regulations adopted by USEPA and chapter 5.5, division 7 of the California Water Code (CWC; commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) for discharges that are not subject to regulation under CWA section 402 (land application and wastewater reclamation) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260)."

Section III: Discharge Prohibitions

Page 11, Prohibition D: The intent of this prohibition is to ensure a proper operation of the Collection System. We request that it be deleted from the Draft Permit, since it is a duplicative requirement; requirements for the Collection System are laid out in detail in Special Provision VI.C.5.f on page 32.

Section IV: Effluent Limitations and Discharge Specifications

Page 16, Reclamation Specification C.4. For clarification, we suggest the addition of the following underlined language:

4. For Disinfected Title 22 Tertiary-level Treated Effluent, effective immediately, its use shall be limited for construction purposes and dust control; however, additional reclamation uses may be approved by the Executive Officer, as specified in IV.C.4.a below. Additionally, the Discharger shall meet conditions specified in California Department of Public Health's (DPH) approval letter dated 2 September 2008 and maintain compliance with the following limitations, with compliance measured at Monitoring Location REC-001 as described in the Monitoring and Reporting Program.

a. Approval of Additional Reclamation Uses. The Discharger shall submit the following information to the Executive Officer in order to obtain approval for additional reclamation sites and uses of recycled water:

- Engineering Report Update (only as needed to address new uses)
- Signed Recycled Water Use Agreement
- Recycled Water User Requirements
- Compliance Inspection and Enforcement Program

After review and approval of these documents, the Executive Officer shall authorize the new recycled water uses and sites by letter to the Discharger.

Section V: Receiving Water Limitations

Page 19, Groundwater Limitations.

- There are no monitoring locations currently associated with this provision. Add the following underlined language for clarification:

  1. Release of waste constituents from any portion of the Facility shall not cause groundwater to:

  a. Contain (as measured at Monitoring Locations MW-3, MW-5, MW-9W, MW-10, MW-11) any of the following constituents in concentrations greater than Water Quality Objectives or natural background quality, whichever is greater in Table 10 below, effective 1 October 2014."

- The Tentative Order does not explain the origination of the Natural Background Quality values included in the last column in Table 10. This provision should be revised as follows:

  1. Release of waste constituents from any portion of the Facility shall not cause groundwater to:

  a. Contain (as measured at Monitoring Locations MW-3, MW-5, MW-9W, MW-10, MW-11) any of the following constituents in concentrations greater than Water Quality Objectives or natural background quality (as measured at MW-AW), whichever is greater in Table 10 below, effective 1 October 2014."

- The Groundwater Interim Limitations Table (Table 11) is missing Footnote 1, explaining that the seasonal limitations are from May 1st through November 30th.

Section VI: Provisions

Page 22, A.2.i.(iii): We request that this Provision be deleted from the Tentative Order as it a duplicative requirement and its objective is achieved through compliance with other permit provisions.

Page 23, A.2.o: Clarify notification requirements as follows: "... the City (...) shall confirm this notification in writing within 5 business days..."

Page 25, C.1, Reopener Provisions: While the Industrial Pipeline System (IPS) was designed for Eckert Cold Storage to be the exclusive user, it is possible that the IPS could serve other industrial dischargers. For example, capacity in the IPS could be made available if Eckert were to significantly reduce their discharge or if they were to go out of business. Should this occur and should another entity with similar discharge characteristics establish a business in Manteca, the City may want to use available capacity in the IPS to serve this new discharger. As such, the City requests that a provision be added to the Tentative Order that would allow the Executive Officer to add or substitute users of the IPS.

Page 25, C.1.h, Reopener Provisions: Because the Bay Delta Plan contains existing objectives, the reopener provision should be modified as follows:

h. The Bay-Delta Plan. The South Delta salinity standards are currently under review by the State Water Board in accordance with implementation provisions contained in the Bay-Delta Water Quality Control Plan. This review in process

includes an updated independent scientific investigation of irrigation salinity needs in the southern Delta. If applicable water quality objectives of the Bay-Delta Plan are revised ~~adopted~~, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate.

Fact Sheet

Page F-13, Title 27: As noted in the comment letter, the findings regarding Title 27 should be significantly revised to apply the appropriate exemptions. At a minimum, however, the final paragraph of the discussion regarding the ponds must be revised as follows:

> The wastewater stored in these ponds consists primarily of either domestic sewage and treated effluent; or treated food processing wastewater. Therefore the wastewater does not need to be managed as hazardous waste. Moreover, all ponds are lined, and therefore, the relatively minimal discharge to groundwater would have little effect to cause to exceed applicable water quality objectives. Thus, the discharges to the ponds are in compliance with the applicable water quality control plan ~~meet the Basin Plan's water quality objectives~~. Based on these findings and section 20090(b), these storage facilities are exempt from the requirements of Title 27, CCR.

Pages F-23 to F-27, Hardness: In each of the Tables F-5 through F-8 the units for the upstream receiving water metals should be µg/L.

Page F-24, Hardness: Please consider the following to bolster the discussion on hardness selection, and the use of Equation 3:

> A similar example as was done for the Concave Down Metals is shown for silver, a Concave Up Metal, in Table F-6 through F-8, below. As previously mentioned, the minimum effluent hardness is 82 mg/L (as $CaCO_3$), while the upstream receiving water hardness ranged from 36 mg/L to 240 mg/L (as $CaCO_3$). In this case, the minimum effluent concentration is within the range of observed upstream receiving water hardness concentrations. Therefore, Equation 3 was used to calculate two ECAs, one based on the minimum observed upstream receiving water hardness and one based on the maximum observed upstream receiving water hardness. Using the assumption of no assimilative capacity at the maximum upstream receiving water hardness results in a negative ECA, which means that not all mixtures of the effluent and receiving water ~~are~~ would be in compliance with the CTR criteria if there was no assimilative capacity in the upstream receiving water based on the maximum upstream receiving water hardness. However, calculating the ECA assuming there is no assimilative capacity at the maximum upstream receiving water hardness is not supported by the data. As shown in Table F-7, the maximum upstream receiving water hardness of 240 mg/L (as $CaCO_3$) corresponds to a receiving water concentration for silver of 18.3 µg/L. But, based on the 5 receiving water samples obtained, silver was not detected and the method detection levels ranged from <0.12 µg/L to <1 µg/L, which demonstrates there is assimilative capacity under those conditions. Therefore, in Table F-8, the ECA has been iteratively determined

assuming the minimum observed upstream receiving water hardness, a maximum upstream silver concentration 0.5 µg/L (i.e., ½ of the maximum method detection limit), and the effluent at the minimum observed hardness. As shown in Table F-8, the ~~chronic~~ calculated acute ECA for silver is 2.7 µg/L. Similarly, in Table F-9, the ECA is calculated using the maximum upstream silver concentration of 0.5 µg/L with maximum observed upstream receiving water hardness, and the effluent at the minimum observed hardness. Using the maximum upstream receiving water hardness, the calculated acute ECA for silver is 2.9 µg/L. In comparing the ECAs calculated in Tables F-8 and F-9, the results from using the minimum upstream hardness are controlling and the limiting acute ECA for silver is 2.7 µg/L.

Tables F-6, F-7, and F-8 not shown for brevity

Table F-9: Silver ECA Iterative Evaluation assuming Assimilative Capacity

Minimum Observed Effluent Hardness	**82 mg/L (as $CaCO_3$)**
Maximum Observed Upstream Receiving Water Hardness	**240 mg/L (as $CaCO_3$)**
Maximum Assumed Upstream Receiving Water Silver Concentration	**0.5[1] µg/L**
Silver ECA_{acute}[2]	**2.9 µg/L**

Silver ECA_{acute}[2]			**CTR Equation**	**Iterative Calculations**
	Mixed Downstream Ambient Concentration			
Effluent Fraction	**Hardness[3] (mg/L) (as $CaCO_3$)**	**CTR Criteria[4] (µg/L)**	**Silver[5] (µg/L)**	**Silver[5] (µg/L)**
0%	240	18.3	0.5	---
5%	232.1	17.3	0.6	---
15%	216.3	15.3	0.9	---
25%	200.5	13.4	1.1	---
50%	161.0	9.2	1.7	---
75%	121.5	5.7	2.3	---
100%	82.0	2.9	2.9	---

1 Maximum upstream receiving water silver concentration based on monitoring data obtained from April 2004 through August 2008.

2 ECA iterative calculation using Equation 3 for acute criteria, for these conditions limited by the acute criterion at hardness of 82 mg/L (as $CaCO_3$).

3 Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

4 Mixed downstream ambient criteria are the acute criteria calculated using Equation 1 at the mixed hardness.

5 Mixed downstream ambient silver concentration is the mixture of the receiving water and effluent silver concentrations at the applicable effluent fraction. Iterations not necessary, as the silver concentrations are below the CTR criteria in all cases.

ATTACHMENT 2

Infeasibility Analysis Compliance Schedule Justification
for
Electrical Conductivity Time Schedule Order

CITY OF MANTECA

PUBLIC WORKS DEPARTMENT

September 10, 2009

Mr. Jim Marshall
Senior Engineer
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive #200
Rancho Cordova, CA 95670

SUBJECT: Infeasibility Analysis and Compliance Schedule Justification for a Time Schedule Order for the City of Manteca Wastewater Quality Control Facility

Dear Mr. Marshall:

Pursuant to your July 2, 2009 letter, the City of Manteca (City) is submitting an infeasibility analysis and justification for a time schedule to comply with the electrical conductivity (EC) effluent limits specified in the August 11, 2009 Tentative Order (NPDES Permit No. CA0081558) for the City's Wastewater Quality Control Facility (WQCF).

In the City's current wastewater NPDES permit, the EC effluent limit is 1,000 µmhos/cm year-round.[1] The TO, however, contains seasonal EC effluent limitations of 1,000 µmhos/cm from September through March and 700 µmhos/cm from April through August. These limitations are based on the current water quality objectives for EC in the southern Delta. As will be discussed below, the WQCF can comply with the 1,000 µmhos/cm limit, but will not be able to achieve consistent compliance with the 700 µmhos/cm limitation. The Central Valley Regional Water Quality Control Board (Regional Water Board) is aware of the City's inability to immediately comply with the 700 µmhos/cm limit, and as such, has publicly noticed a draft Time Schedule Order (TSO). The TSO will establish an interim EC limit that the City can consistently comply with and will provide the City time to achieve compliance with the 700 µmhos/cm limit.

The infeasibility analysis and compliance schedule justification provided here are intended to assist the Regional Water Board in making the findings necessary to issue a TSO that shields the City from mandatory minimum penalties that would otherwise be assessed pursuant to Water Code section 13385. To protect the City from mandatory minimum penalties, the Regional Water Board must find that the final effluent EC limitations are new and/or more stringent limits, and that new or modified control measures cannot be designed, installed and put into operation within 30 calendar days (Water Code, §13385(j)(3)(B)(i)). Further, the Regional Water Board is

[1] As set forth in the City's comments on the Tentative Order, we believe the 1,000 µmhos/cm year-round limit should remain in the WDRs. However, in the event the Regional Water Board proceeds to impose the more stringent summer EC effluent limitation, the City will need a time schedule in order to comply.

required to establish a time schedule for bringing the discharge into compliance that is as short as possible, to establish interim requirements, and to require the discharger to prepare and implement a pollution prevention plan. (Water Code, § 13385(j)(3).)

EFFLUENT LIMIT ATTAINABILITY AND INFEASIBILITY ANALYSIS

A review of the WQCF effluent EC data over the period of September 2007 to May 2009, from the time of the most recent plant upgrades to the most recent available data, indicates that the WQCF will not be able to comply with the proposed final average monthly EC effluent limit (AMEL) of 700 µmhos/cm effective seasonally from April 1 through August 31. **Table 1** compares the final AMEL for EC to the maximum monthly average observed in the WQCF effluent since September 2007 when WQCF upgrades were brought online.

Table 1. WQCF Performance versus EC Effluent Limitations

Constituents	Units	Monthly Average Effluent Limitation	Maximum Observed Monthly Average Effluent Concentration
EC, April to August	µmhos/cm	700	783
EC, September to March	µmhos/cm	1,000	827

As shown in **Table 1**, the City will not be able to comply with the 700 µmhos/cm final AMEL from April through August. The highest monthly average EC concentration in the WQCF effluent over these summer months is 783 µmhos/cm (measured in April 2008). From September 2007 to May 2009, 6 out of 7 monthly averages for the summer months were above the final EC AMEL. As such, the WQCF is unable to comply with the proposed final EC effluent limits and would be consistently at risk of non-compliance with the summer AMEL. Effluent EC monitoring results are shown with the final effluent limits in **Figure 1**.

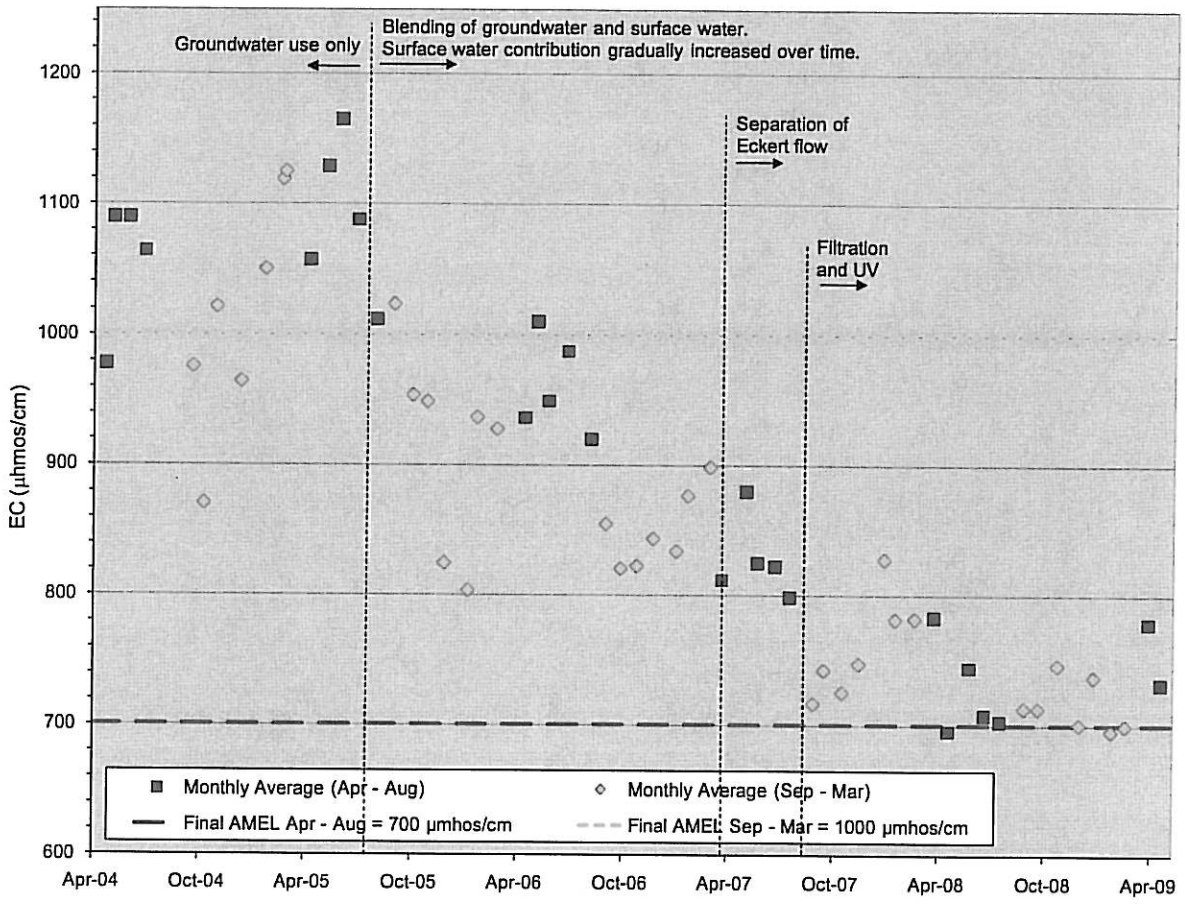

Figure 1. WQCF Effluent Electrical Conductivity Levels and Final Average Monthly Effluent Limits (AMELs)

SOURCE CONTROL AND POLLUTION PREVENTION EFFORTS

Water Supply

A review of the monitoring record indicates that the EC levels measured in the WQCF effluent have steadily decreased in recent years (see **Figure 1**). This decrease is largely due to the City's commitment to improve the WQCF effluent quality through a series of operational changes and significant investment in new potable water supplies. Prior to mid-2005, the City used groundwater as its sole potable water source. The groundwater in the area is high in total dissolved solids (TDS), and thus caused high EC levels in the WQCF effluent. Beginning in August 2005, the City started substituting a portion of its potable water supply from groundwater with surface water from the newly constructed South San Joaquin Irrigation District surface water treatment plant. The surface water supply contribution has steadily increased over time and is approaching 50% of the City's total supply, a contribution level expected to remain constant in future years.

Industrial Source Control

To further reduce effluent EC levels, the City constructed the Industrial Pipeline System to eliminate pollutants of concern (including EC) discharged to the WQCF by the City's largest industrial discharger, Eckert Cold Storage (Eckert). The Industrial Pipeline System, which has been fully operational since April 2007, is solely dedicated to Eckert's food-processing wastes for direct application to agricultural fields. As illustrated in **Figure 1**, the City's changes in water supply and industrial source control have reduced average effluent EC levels from approximately 1,100 µmhos/cm to less than 800 µmhos/cm, more than a 27% reduction.

Pollution Prevention Program

The TSO requires the City to develop and implement an EC Pollution Prevention Plan (PPP) within 6 months of permit adoption. The City is committed to developing an appropriate PPP aimed at further limiting and/or reducing EC in the WQCF influent to the extent feasible. A source identification analysis will be conducted within the specified timeframe, however, the recommendations of the PPP and their effectiveness are not known at this time.

ADVANCED TREATMENT ALTERNATIVES

The City previously identified EC as a constituent of concern and has diligently worked to reduce EC effluent levels as explained above and as illustrated in **Figure 1**. Further reduction may be accomplished through pollution prevention as required by the TSO. As an alternative to source control, advanced treatment using microfiltration and reverse osmosis (MF/RO) could be implemented for a portion of the WQCF's effluent during the summer months. To achieve average summer effluent EC levels below 700 µmhos/cm, MF/RO treatment would be needed for 2.5 MGD of the WQCF's effluent. Initial construction costs for the MF/RO facilities are estimated at $33.4 million with an additional $3.7 million in annual operation and maintenance costs. It should be noted that these costs do not account for the disposal of approximately 0.5 MGD of highly saline brine that will result from the MF/RO process. Furthermore, the resulting improvement in river water quality would be *de minimis* and would not justify the cost of MF/RO. Moreover, the construction and use of a MF/RO facility would create significant adverse environmental impacts such as toxic contaminants disposal, crystallized residuals disposal, and off-site brine disposal. In addition, the sizeable energy demands of a MF/RO process would lead to increases in greenhouse gas emissions, which would significantly expand the carbon footprint of the Manteca WQCF and run contrary to the intent and stated goals of AB 32. For these reasons, the City does not consider MF/RO as a feasible treatment alternative at this time.

SOUTHERN DELTA SALINITY OBJECTIVES

Relevant to the City's efforts to reduce EC is the State Water Resources Control Board's (State Water Board) effort to reevaluate salinity objectives for the southern Delta. Most recently, the State Water Board held a workshop on August 13, 2009 to discuss a draft technical analysis[2] of irrigation water EC requirements that are protective of agriculture in the southern Delta. The

[2] Dr. Glenn Hoffmann, "Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta", Draft Report to the State Water Resources Control Board, July 14, 2009.

City participated in the workshop and intends to continue participating through the evaluation process. The draft conclusion from the August 2009 workshop is that the summer objective of 700 µmhos/cm may be more stringent than required to protect agricultural beneficial uses. As such, the State Water Board's efforts may result in a relaxation of EC requirements. Should this occur, provisions in the City's permit allow it to be reopened to adjust the EC effluent limit. Given the City's past and ongoing efforts to reduce EC, the WQCF could achieve consistent compliance if modest adjustments were made to the City's final EC effluent limit.

COMPLIANCE SCHEDULES REQUESTED

Compliance with the proposed final EC effluent limits is not immediately feasible for the WQCF, and as such, the TSO should include interim limits with which the WQCF can comply. The City requests that the Regional Water Board adopt a draft TSO that gives the City time to complete a Compliance Workplan, to develop and implement a PPP and to work toward full compliance with EC provisions contained in the Tentative Order. Although the recommendations of the PPP are not known at this time, salinity reduction plans are usually based on source identification studies. If in following such a study the City finds that residential water softeners are identified as a significant salinity source, the City may have to develop and enforce a program to reduce the use of brine-discharging softeners. Once implemented, the program is expected to result in a gradual reduction of salinity levels at the WQCF. As detailed in **Table 2** below, the City requests five years to implement these activities with full EC compliance expected by October 14, 2014.

To allow time for completion of the State Water Board's salinity objective reevaluation (of unknown and potentially extended duration), a source-identification study and possible implementation of a water-softener program, the schedule presented in **Table 2** is as short as practicable.

Table 2. Proposed Actions and Estimated Time to Complete

Proposed Action	Estimated Time to Complete
Develop Compliance Workplan and Pollution Prevention Plan	Within 6 months of Permit adoption
Participate in SWB reassessment of southern Delta EC objectives: • Review technical analysis • Participate in SWB's evaluation of technical analysis • Request modification of effluent limitations based on SWB adjustments of the EC objectives, if appropriate	2 – 8 years, potentially longer
Implement Compliance Workplan and Pollution Prevention Plan, which may involve: • Salinity Source Identification Study • If appropriate, develop plan for restricting use of residential water softeners (develop local legislation, public education programs, enforcement programs, etc.)	Within 4 ½ years following completion of the Compliance Workplan and Pollution Prevention Plan
Achieve compliance with final EC effluent limits	By October 14, 2014

The City requests that the Regional Water Board adopt a draft TSO that gives the City until October 14, 2014 to comply with the final EC effluent limitations contained in the Tentative Order and that protects the City from the imposition of mandatory minimum penalties in the intervening period. The City appreciates your consideration in this matter, and please feel free to contact me with any questions or if you need additional information.

Sincerely,

Phil Govea

Phil Govea, P.E.
Deputy Director of Public Works – Utility Engineering

cc: Gayleen Perreira, Regional Water Board
Mark Houghton, City of Manteca
Mack Walker, Larry Walker Associates
Roberta Larson, Somach Simmons & Dunn

ATTACHMENT 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

FACT SHEET

ORDER NO. R2-2009-XXXX

AMENDMENT OF WASTE DISCHARGE REQUIREMENTS FOR DISCHARGERS INDICATED IN TABLE 1 OF PERMIT AMENDMENT

This Order amends the requirements in the Order Nos. indicated in Table 1 to revise and further specify the method for determining compliance with dioxin-TEQ effluent limits.

As explained below, the revised compliance approach contained in the permit amendment is consistent with federal and state policies and guidance.

Independent Panel of Dioxin Experts

In early 2008, the San Francisco Estuary Institute (Institute) convened a panel of qualified experts to provide an unbiased review and analysis of factual information currently available for dioxin as it pertains to San Francisco Bay. The panel of experts met in Oakland, California, on February 22, 2008, at the Institute. The panel was joined by representatives of (and stakeholders from) the San Francisco Bay Regional Water Quality Control Board, the US Environmental Protection Agency, the Bay Area Clean Water Agencies (BACWA), and others with expertise in the field. Subsequently, the panel held several conference calls and agreed to address questions posed by the Institute in both short- and long-term contexts.

Nationally, the panel of experts pointed out, *The Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States: The Year 2000 Update* (External Review Draft, March 2005; EPA/600/P-03/002A) includes an inventory of contemporary releases from known sources of dioxin in the United States. Only preliminary estimates were available for municipal wastewater discharges but they accounted for only 0.2% of the total estimated releases in the United States for 2000. Releases to air, at 8,187 g TEQ/yr, accounted for 98.6% of the 2000 total. Prior to this report, a 1998 report on dioxin in San Francisco Bay by Regional Water Board staff indicated that municipal and industrial wastewater treatment plants contributed 2% of dioxin to San Francisco Bay. The USEPA Region 9 website points out that this information is based on preliminary data and that source categories nationally and in the Bay Area are not well characterized. It is clear that publicly-owned treatment works (POTWs) are a very small percentage of dioxin to San Francisco Bay.

The San Francisco Estuary Institute prepared a report titled, *Dioxins in San Francisco Bay: Conceptual Model/Impairment Assessment* in January 2005, which included an evaluation of the current level of impairment of dioxins and furans in San Francisco Bay. The Institute determined that dioxins and furans in San Francisco Bay are mostly produced as byproducts of combustion of various materials and as contaminant byproducts of chlorinated-chemical processes, such as syntheses of organochlorine pesticides, pulp bleaching, and manufacture of polyvinyl chloride (PVC). In the past, specific "point-source" emissions from facilities such as incinerators and smelters were estimated to be the largest sources of dioxins. However, currently it is believed that most of those large point sources have been controlled. The San Francisco Estuary Institute report further indicates that more disperse sources, such as yard burning and vehicle emissions, remain uncontrolled and persist at levels similar to those in the past.

Suspected scant sources of dioxins in municipal wastewater include laundry gray water, human waste, food waste, storm water inflow, shower water, bleached toilet paper and industrial sources. The ability to control the low levels of dioxin congeners present in treated municipal effluent through either source control or additional treatment is uncertain. Pollution prevention for dioxin congeners is challenging given the ubiquitous nature of these compounds in the above mentioned sources and the extremely low concentrations at which these compounds are present in wastewater (typically four to five orders of magnitude lower than detectable levels of mercury and other constituents of concern). Analytical limitations hinder the ability to use monitoring as an element of a pollution prevention program. Sample contamination and analytical anomalies in effluent samples also limit quantitative approaches to pollution prevention. Regional and source- specific measures represent the best approach to pollution prevention for dioxin congeners in the San Francisco Bay region.

It is therefore apparent that municipal wastewater treatment plants are not a significant source of dioxin to San Francisco Bay. This fact makes it even more important to use the best science and understanding currently available to develop a permitting and compliance strategy.

Dioxin-TEQ Water Quality Criteria

40 CFR 122.44(d) provides that, where Reasonable Potential exists for a pollutant that does not have a numeric water quality criterion or objective, such as for a narrative water quality objective, water quality-based effluent limits (WQBELs) may be established by using a calculated numeric water quality criterion supplemented with other relevant information. WQBELs may take the form of mass limits, water column concentration-based limits, or a non-numeric program of source control and best management practices established under a schedule of compliance. The assessment of the need for dioxin-TEQ WQBELs in the Orders listed in Table 1 of the permit amendment is based on interpretation of the Basin Plan's narrative water quality objective (WQO) for bioaccumulative substances using the CTR's numeric WQO for 2,3,7,8-tetrachlorinated dibenzo-p-dioxin (2,3,7,8-TCDD) and other relevant scientific information, including USEPA guidance, as described below. Numeric criteria for dioxin-TEQ are not established in the CTR. The Basin Plan narrative WQO for bioaccumulative substances states:

> *Many pollutants can accumulate on particulates, in sediments, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause*

a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.

Because it is the consensus of the scientific community that dioxins and furans associate with particulates, accumulate in sediments, and bioaccumulate in the fatty tissue of fish and other organisms, this Regional Water Board has applied the Basin Plan's narrative bioaccumulation WQO in the regulation of these pollutants. Elevated levels of dioxins and furans in fish tissue in San Francisco Bay demonstrate that the narrative bioaccumulation WQO is not being met. USEPA has therefore included all segments of the San Francisco Bay in the current 303(d) listing as impaired by dioxin and furan compounds. In consideration of the applicability of the narrative WQO for bioaccumulative substances to WQBELs for dioxin-TEQ in wastewater effluent, a key factor is whether these constituents are controllable. As stated above, available information indicates that the ability to control these constituents through wastewater treatment or source control is unknown and uncertain. Additionally, it is well understood that wastewater effluent is a small source in the regional context. This information has been considered by the Regional Water Board in its exercise of best professional judgment in the regulation of dioxin TEQs.

The CTR establishes a numeric WQO for 2,3,7,8-TCDD of 1.4×10^{-8} µg/L for the protection of human health. When the CTR was promulgated, USEPA stated its support of the regulation of other dioxin and dioxin-like compounds using toxicity equivalencies (TEQs) in NPDES permits. For California waters, USEPA recommended, "if the discharge of dioxin or dioxin-like compounds has reasonable potential to cause or contribute to a violation of a narrative criterion, numeric WQBELs for dioxin or dioxin-like compounds should be included in NPDES permits and should be expressed using a TEQ scheme." [65 Fed. Reg. 31682, 31695 (2000)] This procedure, developed by the World Health Organization (WHO) in 2005, uses a set of toxicity equivalency factors (TEFs) to convert the concentration of any congener of dioxin or furan into an equivalent concentration of 2,3,7,8-TCDD.

Rationale for Bioaccumulation Equivalency Factors

USEPA's comprehensive assessment of dioxin uptake by biological systems has shown that each dioxin congener's assimilation is individually definable. These individual factors for specific congeners, when converted to a 2,3,7,8 TCDD equivalency, are referred to as bioaccumulation equivalency factors or BEFs. BEFs account for the biological uptake from the water column of the various dioxin congeners and properly adjust the TEQ-based water quality objectives that would otherwise suggest complete and equal biological assimilation of each dioxin congener. USEPA supports the modification of TEFs using BEFs for dioxin-TEQ. Specifically, USEPA has stated, "TEFs and BEFs shall be used when calculating a 2,3,7,8-TCDD toxicity equivalence concentration when implementing both human health noncancer and cancer criteria." [40 CFR, Part 132, Appendix F] The applicable TEFs and BEFs are shown in Table F-1, below.

Table F-1. Dioxin/Furan TEFs and BEFs

Dioxin/Furan Congener	WHO 2005Toxicity Equivalency Factor (TEF)	Bioaccumulation Equivalency Factor (BEF)
2,3,7,8-TCDD	1.0	1.0
1,2,3,7,8-PeCDD	1.0	0.9
1,2,3,4,7,8-HxCDD	0.1	0.3
1,2,3,6,7,8-HxCDD	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.05
OCDD	0.0003	0.01
2,3,7,8-TCDF	0.1	0.8
1,2,3,7,8-PeCDF	0.03	0.2
2,3,4,7,8-PeCDF	0.3	1.6
1,2,3,4,7,8-HxCDF	0.1	0.08
1,2,3,6,7,8-HxCDF	0.1	0.2
2,3,4,6,7,8-HxCDF	0.1	0.7
1,2,3,7,8,9-HxCDF	0.1	0.6
1,2,3,4,6,7,8-HpCDF	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.4
OCDF	0.0003	0.02

The following formula demonstrates the mathematical relationship of TEQ to BEFs to TEFs:

$$TEQ = S\ ((C)_x * (TEF)_x * (BEF)_x)$$

where:

TEQ = Toxicity equivalent quotient
$(C)_x$ = concentration of congener *x*
$(TEF)_x$ = TCDD toxicity equivalency factor for congener *x*
$(BEF)_x$ = TCDD bioaccumulation equivalency factor for congener *x*

In the absence of site-specific BEFs, USEPA supports applying the BEFs calculated using national bioaccumulation factors. This is justified by the favorable comparison of BEFs calculated in other aquatic systems to those calculated for the general BEFs. USEPA stated specifically, "In the absence of site-specific data, EPA believes that national bioaccumulation factors are broadly applicable to sites throughout the United States and can be applied to achieve an acceptable degree of accuracy when estimating bioaccumulation potential at most sites." In addition, USEPA indicated that BEFs calculated from data obtained for multiple ecosystems confirms that the small potential differences in bioaccumulation mean that these BEFs are predictive of bioaccumulation differences for dioxins and furans in fish for ecosystems throughout the U.S. [Methodology for Deriving Ambient Water Quality Criteria for Protection of Human Health, Draft Technical Support Document, Volume 3, Development of Site-Specific Bioaccumulation Factors, pp. 1-5, 5-28]

Rationale for Use of Minimum Levels with Those Specified in USEPA Guidance

Minimum Levels (MLs) specified in Table F-2 are consistent with the most recent USEPA guidance, which is 62 Federal Register pp. 48393-48442 (1998). The Dischargers listed in the permit amendment shall use the Minimum Levels (MLs) specified in Table F-2, and this requirement supercedes any listed MLs in existing permits.

Table F-2. Minimum Levels for Dioxin Congeners

Parameter	Minimum Level	Units
2,3,7,8-TCDD	10	pg/L
1,2,3,7,8-PeCDD	50	pg/L
1,2,3,4,7,8-HxCDD	50	pg/L
1,2,3,6,7,8-HxCDD	50	pg/L
1,2,3,7,8,9-HxCDD	50	pg/L
1,2,3,4,6,7,8-HpCDD	50	pg/L
OCDD	100	pg/L
2,3,7,8-TCDF	10	pg/L
1,2,3,7,8-PeCDF	50	pg/L
2,3,4,7,8-PeCDF	50	pg/L
1,2,3,4,7,8-HxCDF	50	pg/L
1,2,3,6,7,8-HxCDF	50	pg/L
1,2,3,7,8,9-HxCDF	50	pg/L
2,3,4,6,7,8-HxCDF	50	pg/L
1,2,3,4,6,7,8-HpCDF	50	pg/L
1,2,3,4,7,8,9-HpCDF	50	pg/L
OCDF	100	pg/L

Rationale for Use of Values Below the Minimum Level

The San Francisco Estuary Institute panel of experts indicated that effluent concentrations for many congeners measured utilizing the high-volume screening techniques, that are not approved for regulatory application purposes, remain orders of magnitude lower than the EPA Method 1613 MLs, despite legitimate concerns about their accuracy. In addition, the overestimation resulting from assumptions used in estimating non-quantified values is compounded by the summation of congener-specific values when calculating dioxin-TEQ, resulting in an estimate that may be artificial rather than accurate.

In addition, federal guidance for Discharge Monitoring Reports (DMRs) indicate that data points below the practical quantitation limit (PQL, which is equivalent to the ML in this situation) shall be treated as zero when calculating averages with a mix of data points above and below the PQL.

Therefore, Dischargers listed in the permit amendment are required to set congener values below the ML to zero when calculating dioxin-TEQs for determining effluent compliance. It should be

noted, however, that measured values of individual congeners shall also be reported separately.

Rationale for Making Final Limits Immediately Applicable and Removing Dioxin-TEQ Compliance Schedules

The Regional Water Board concludes that immediate compliance with dioxin-TEQ final effluent limits using the revised compliance approach described in the paragraphs above is feasible, based on an analysis of historical dioxin congener concentration data using the revised compliance approach described in the permit amendment. In particular, dioxin congener data from approximately 50% of the municipal wastewater treatment plants in the Bay Area were reviewed. Three percent of 168 samples were shown to be out of compliance. However, BACWA has been training Bay Area municipal agencies over the previous year in the prevention of sample contamination, evaluation of analysis results, and general quality control/quality assurance techniques, because it is suspected that some or all of the high congener concentrations have been due to data quality issues. As a result, municipal wastewater treatment agencies are expected to have improved data quality in the future, which would result in more accurate and most likely lower concentrations in comparison with historical results.

It is expected that Dischargers listed in Table 1 of the permit amendment will be able to comply with final dioxin-TEQ effluent limits. With the revisions indicated above for determining compliance, the dioxin-TEQ final effluent limits shall become immediately applicable upon the effective date of this permit, and any dioxin-TEQ compliance schedules shall be removed from the respective permits.

Rationale for making monthly average effluent limits sufficient.

The dioxin-TEQ final effluent limits are based on interpretation of the Basin Plan's narrative WQO for bioaccumulative substances using the CTR's numeric WQO for 2,3,7,8- TCDD for the protection of human health. 40 CFR 122.44(d) provides that, where Reasonable Potential exists for a pollutant that does not have a numeric water quality criterion or objective, such as for a narrative water quality objective, water quality-based effluent limits (WQBELs) may be established by using a calculated numeric water quality criterion supplemented with other relevant information. In addition, the State Implementation Policy does not provide a specific effluent limit calculation procedure for other than aquatic life objectives. Because the impacts of dioxin exposure are estimated based on long-term conditions, the average monthly effluent limit is sufficient for protection of human health and the maximum daily effluent limit is not necessary.

Rationale for Notifying Regional Water Board When Accepting Dry Weather Urban Runoff and/or Stormwater Flows So That Incremental Dioxin Loadings Can Be Addressed

Dischargers listed in this permit amendment that direct dry weather urban runoff or stormwater flows into the collection system as part of a watershed management strategy, may have increased dioxin releases that would contribute to excursions of their effluent limits. Under such a scenario, a Discharger's dioxin effluent limit will be modified to account for added pollutant contributions from urban runoff or stormwater flows. A Discharger may also develop a mass

offset program to be submitted to the Regional Water Board for approval of a mass offset plan to reduce net dioxin-TEQ discharges. The Regional Water Board may modify an individual Permit Order to allow an approved mass offset program.

Notification of Interested Parties

The Regional Water Board encouraged public participation in the amendment process. It notified the Dischargers and interested agencies and persons of its intent to amend Order No. R2-2009-XXXX, and provided them with an opportunity to submit their written comments and recommendations. On XXX date, the *[put news media here]* published a notice that this item would appear before the Regional Water Board on November 11, 2009.